IMPLICATIONS OF PERCEPTIONS OF A TEACHER IMPLEMENTING AUTHENTIC ASSESSMENT

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Approved by Committee:

Dr. Mary Ducharme, Chair

Dr. Edward Ducharme

Dr. Patsy J. Fagan

Dr. Richard L. Schwab
Dean of the School of Education

Implications of Perceptions of a Teacher Implementing Authentic Assessment

An Abstract of a Dissertation by
William A. Wright
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Drake University
Advisor: Mary Ducharme

The problem. The purpose of this study was to qualitatively describe and document the perceptions of a teacher as she implemented authentic assessment in a sixth grade classroom. Specifically, this study was to answer the following research questions: (a) What were the experiences and perceptions of a teacher as she implements authentic assessment in sixth grade science? (b) What student changes were observed during the treatment time period?

Procedures. Four sixth-grade life science classes were instructed by the subject of this study utilizing authentic assessment. Instruction consisted of one 45-minute lesson per day over a 10-week period. Data was collected through a qualitative design that included interviews, journaling, audio/video recordings, memos/notes, personal observations, and other documentation such as examples of student work/projects, lesson plans, and evaluation instruments.

Findings. The analysis of the data collected was categorized into 10 Assessment Criteria Benchmarks. Nine of these benchmarks were based on teacher perception and one was based on student performance. The findings included the following observations: the teacher's degree of risk-taking increased as the project progressed; the teacher perceived time, issues of fairness, and designing appropriate assessments as primary barriers or problems; the teacher perceived more students successful and taking a greater responsibility for their learning while authentic assessment strategies were used in the classroom; and the teacher observed lower functioning students performing at a higher level during authentic assessment activities.

Conclusions. The results of this study support the conclusion that the authentic assessment method may be a valuable assessment alternative to be utilized in the classroom. Also, the results support the conclusions of Fullan (1992) and Hall (1976) that change is a process, a journey, not a blueprint and that every person needs to be his/her own change agent.

Recommendations. The results of this study indicate that although authentic assessment is time consuming and not applicable in all situations, it is a viable alternate assessment method. More research should be conducted to examine the relationship of authentic assessment strategies and the educational outcomes for students of varying abilities and learning styles.

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Chapter 1

INTRODUCTION

> Traditional approaches to both the assessment of student abilities and the design of instructional programs have recently come under strong attack. Of particular concern to many is the nature of the link between assessment and instruction.
>
> - J. C. Campione

Interest in assessment methods that measure what actually occurs in classrooms is growing. The interest in assessment options has been largely prompted by the focus on curriculum reform in school districts. Educators are asking investigating questions like "What are we looking for when we assess students learning?" "What do we want students to know and understand?" and, "What kind of classroom culture nurtures the development of these understandings?" They are also broadening their approaches to instruction. In reading instruction, for example, teachers are experimenting with "whole language" and "developmentally appropriate practice." Teachers are placing greater emphasis on the purposes and meaning of reading with less specific emphasis on isolated subskills and giving more attention to students' interests and styles of learning, with less adherence to a prescribed sequence. As teaching practices change in these more open, child-oriented directions the gap between the lessons of instruction and the content of traditional tests becomes wider (Chittenden, 1991).

Some researchers are examining alternate forms of student assessment. These alternate forms of assessment include a complicated reevaluation of classroom activities and responsibilities which may transform the classroom from one in which students are passive receivers of information to a classroom environment where students take on increased responsibility for their learning and assessment. For example, Zessoules and Gardner (1991) believe the type of assessment that students engage in on a daily basis must change, altering the responsibilities of students and teachers in increasingly sophisticated ways. Ultimately this will transform the mechanical, and disengaging moments, when learning stops and testing begins, into a continuum of moments combining assessment, instruction, and learning (p. 63).

Teachers and researchers are struggling to define assessment tasks based on authentic, real-life tasks drawn from in-school and out of school experiences which are also performance-based (Resnick, 1987; Wolf, LeMahieu, & Eresh, 1992). Frequently, these more authentic assessment processes require significant changes in student and teacher roles such as greater student ownership of his/her own learning and the transformation of the teacher from an information giver to a facilitator. These changes in student and teacher roles result in more child-centered

learning, collaboration, and the introduction of realistic problems into the classroom (Ogle, Pink, & Jones, 1990).

Such shifts to alternate assessments pose potential issues to be resolved. For example, classroom assessment requires a great deal of the teacher's time and effort. Stiggins (1988, p. 347) estimates that as much as 40% of a teacher's time may be directly involved in assessment-related tasks. Schools must accommodate to the increased time requirements if authentic assessment is to be implemented.

Second, increased teacher expertise is needed. Northwest Regional Educational Laboratory (NWREL) reported that most teachers who NWREL researchers studied had taken courses in measurement during their teacher preparation. However, the teachers contend that almost none of these courses helped them in their classroom. The researchers concluded that teachers, particularly beginning teachers, are neither trained nor prepared to face the rigorous demands of classroom assessment (NWREL, 1990).

Alternate forms of assessment have become a national and international issue. California has been highly committed to alternate assessment, one based on a powerful curriculum built on a clear understanding of the nature of learning and knowledge. All students are encouraged to think, engage in real-world problem solving, and share in

curriculum that respects the integrity of the disciplines yet emphasizes the connections among them (Shepard, 1989, p. 6). Other states including, Minnesota, Wisconsin, Indiana, California, Vermont, and Iowa are also developing alternate assessment strategies. Educators in other countries around the world are also investigating the assessment issue. Canada's Ministry of Education published the Year 2000: A Framework for Learning. In it the writers state that curriculum and assessment should be learner focused. The important components included in the framework relating to assessment include:

1. assessment and reporting should help students make informal choices
2. assessment should be based as much as possible on the learner's product (e.g., a piece of writing, an oral presentation, a drawing, a constructed object, a performance)
3. at regular intervals, teachers should provide progress reports to students and their parents about the knowledge, skills, and attitudes that the students are demonstrating (Year 2000, 1989, p. 4).

Research in assessment has primarily been in the improvement of standardized testing rather than on understanding effective ways to assess learning in the classroom (Natriello, 1987). Other methods of assessing

classroom learning may, in fact, be as effective as standardized tests. There is no one way to assess student achievement. Educators must work together to think through the needs of their own situations and develop methods that will work for them.

Educators are currently developing alternative methods of assessing students in the classroom. Grant Wiggins has developed the Authentic Assessment method which reduces reliance on traditional methods of testing while attempting to elevate the importance of teacher observations and of student performances. Authentic assessment occurs concurrently with instruction. Teachers divide the curriculum into expected student outcomes and create tasks to achieve or demonstrate mastery in those outcomes. This allows a thorough preparation and accurate assessment by the student (Wiggins, 1989).

Wiggins describes his view of assessment in a key phrase: "We must assess what we value and value what we assess" (Wiggins, 1990, p. 5). This statement directs educators to determine what they want students to be able to do at various stages in their learning experience. Assessment is thus an ongoing part of the teaching and learning process and not something separate. People have defined alternate assessment in various ways. Wiggins defines the elements of Authentic Assessment in the

following manner. First, the assessment activity must look and feel like a learning activity; that is, teachers should not ask students to do an assessment task that ordinarily would be part of a regular classroom learning activity. Second, assessment tasks should involve higher-order challenge rather than only the regurgitation of information already gathered. Third, assessment tasks should establish performance-based criteria for learning that lets students know what it means to do their schoolwork well (Wiggins, 1989).

Such assessment techniques should be carefully designed to meet mutual instructional goals of the teacher and the learner. In sum, meaningful assessment should serve as a catalyst for the improvement of school programs.

> No longer a weapon for rooting out and combating students' weaknesses, assessment becomes an additional occasion for learning--a tool for students, as much as for teachers, parents, and administrators, to discover strengths, possibilities, and future directions in student work. (Zessoules & Gardner, 1991)

Statement of the Problem

This study is an exploratory effort to document the effects upon one teacher as she goes through the implementation process of Authentic Assessment in sixth grade science instruction.

Rationale for the Study

There is a large body of literature that attests to the complexity of the change process in education (Fullan, 1992; Guskey, 1986; Hall, 1979; Showers, 1983; Sparks, 1983). Educational researchers are especially interested in the changes that occur to a teacher during the implementation of a new instructional method or strategy because If the method implemented proves to be valuable, it then might be replicated in other studies and eventually become a proven strategy in the classroom. Coupled with the interest in teacher change is the ongoing criticism of educational tests. Researchers continue to examine student measurement processes that might be more valid and reliable than current assessment techniques. Authentic assessment, the technique utilized in this study, is educationally relevant to the issues of the 1990s and beyond because the issue of assessment is a cornerstone of education reform in the 1990s: the President's education agenda, America 2000; the National Education Goals set by the governors; concerns for international competitiveness; renewed calls for restructuring; and accountability at the state, local, and school levels. At the same time, there is a growing dissatisfaction with traditional, multiple-choice forms of testing, that naturally leads educators to re-think the types of assessments needed to provide more authentic and

meaningful feedback for improvement of student learning and instructional practice (Marshall, 1992).

Definition of Terms

Authentic Assessments: The assessment strategies as defined by Wiggins.

Alternate Assessments: A variety of student assessment strategies currently being examined that tend to be more ongoing, cumulative, open-ended, and performance based.

Rubric: A prescribed set of codes or standards governing student action or procedures.

Traditional Assessments: Refers to those commonly used student assessments such as written test items, quizzes, essays, criterion referenced tests, and standardized multiple choice tests.

Assumptions of the Study

There are three assumptions important for interpreting this research. The first is the teacher and classroom in this study are knowledgeable of the authentic process. The second assumption is the teacher interviewed shares ideas, beliefs, and values that have shaped her teaching practices (Cuban, 1984). Knowles (1988, p. 8) suggests that "teaching practice is to some degree a reflection of school and education - relating life experiences and the resultant ordering of personal priorities and beliefs about teaching."

The third assumption is that an interview study, using qualitative data collection methods, provides an in-depth information base. Erickson (1986, p. 146) notes that qualitative research

> contains empirical assertions that vary in scope and in level of inference . . . data analysis is to generate these assertions, largely through induction . . . reviewing the data corpus repeatedly to test the validity of the assertions that were generated, seeking disconfirming evidence as well as confirming evidence.

The purpose of interview research is to gain unique insights into another's perceptions (Merriam, 1989). According to Patton (1980, p. 196), interviewing is the best way to uncover "what is in and on someone else's mind." By reviewing repeatedly the audiotapes and interview notes, the researcher provides a detailed and in-depth description of the beliefs and values of the teacher being studied. In this study, after interviewing the teacher, I then categorized, sorted, and compared to provide an analysis of the differing characteristics, values, and beliefs that she exhibited throughout the study.

Significance of Study

Authentic assessment is an example of a current innovation that many districts are examining and/or implementing. Results from this study will aid researchers and educators in understanding the factors that influence the change process in a teacher as she implements a new

instructional method or process in the classroom. The purpose of this dissertation is to study a specific classroom environment where a teacher uses authentic assessment evaluation is used in sixth-grade life science and to discover the changes that occur in her performance. The results of this investigation, in addition to giving a more accurate picture of the factors associated with teacher change, might also suggest some strengths and weaknesses of the Authentic Assessment.

Chapter 2

REVIEW OF LITERATURE

This chapter consists of four parts. In the first part, I provide an overview of theories of implementation and change and describe several models and/or processes of change including the Concerns Based Adoption Model (CBAM) (Hall, 1979). In the second part, I review changing assessment methods. I address alternate approaches of student measurement in science in part three, and include a description of Grant Wiggins Authentic Assessment approach in the final part of this chapter.

Theories of Implementation and Change

Fullan (1982), a key person in the change literature, describes key factors in the understanding of change in schools. He states five kinds of identifiable and measurable outcomes of the change process: (a) degree of implementation--degree of teacher change; (b) attitude toward innovation--perception of strengths and weaknesses of the change; (c) impact on students by assessment of learning, on teachers' benefits by professional development and growth, and on organizational change by increased peer collegiality; (d) continuation of site-based management (e.g., budget); and (e) attitude toward school improvement--attitude toward making changes.

Fullan (1985) cited four case studies by Showers, Huberman, Stallings, and Little and summarized the results by inferring these key factors:

1. Change is a process, not an event, happening over time
2. Anxiety and uncertainty are common in initial changes
3. Assistance is needed
4. Change occurs through practice and feedback
5. The teacher needs to understand the rationale and reason for implementing the new strategy
6. Organizational conditions of administrative support and peer norms help toward successful implementation
7. Successful change occurs through interaction with peers and administration

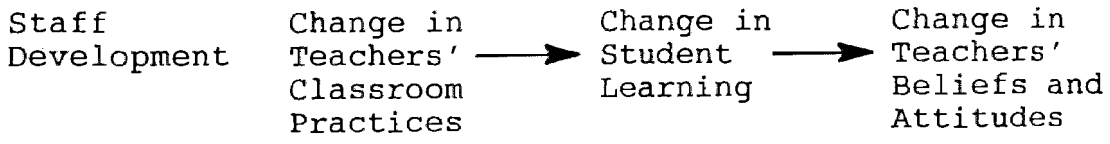
Another important influence on the change in teacher behavior is the opportunity to practice new skills and receive feedback on performance. The simplest form of practice occurs in the classroom where the teacher has the opportunity to practice and receive immediate feedback by observing the effect on students (Sparks, 1983).

More formal practices for feedback include peer coaching. Researchers tested teachers' modes of thinking

during a study of coaching (Showers, 1983). Showers theorized that teachers' modes of thinking range from concrete rigid thought and behavior to abstract and more flexible thought and behavior. Among the study's findings is that the teachers who were more flexible thinkers were more capable of using the recommended models of teaching as the researchers intended (Showers, 1983).

Another model of teacher change suggests that significant change in the beliefs and attitudes of teachers is contingent on their gaining evidence of change in the learning outcomes of their students. This perspective on teacher change is based on the concept that change is a learning process, determined to a large degree by their classroom experiences (Guskey, 1986).

The model below illustrates this process of teacher change:



Some broad factors of an educational change influencing the implementation process are "the characteristics of the change, the strategies used to implement the change, the characteristics of the teachers who will implement the change, the school environment where the change is

implemented, and the outside environment that encroaches on school decisions" (Waugh & Punch, 1987).

Specific experiences can also increase the capacity of individuals to manage change and cope better with the ambiguity of change. Individuals need the skill of personal vision-building to keep in touch with themselves, find their inner voice, constantly seek new ideas, and consistently develop new skills and new strategies for collaboration. More introspection is essential, essential for survival throughout the change process. What seems to get lost in the process of educational change is the understanding that change is highly personal (Fullan, 1992).

Fullan developed eight lessons that emerge from looking at change as non-linear, paradoxical, and demanding the togetherness of elements that appear at first glance to be mutually exclusive. These eight lessons define a new paradigm to deal with the complexity and perplexity of change. They include:

1. Lessons number one: You can't mandate what matters. The heart of change, the skills, and the know-how, the commitment and the motivation, the attitudes, cannot be mandated, cannot be mobilized from the top. The things that matter most in terms of teaching/learning effectiveness cannot be mandated.

2. Lesson number two: Change is a journey, not a blueprint. The ultra-rational approach that insists on blueprints and organization and strategic planning in advance of a project's beginning is not needed. Begin the process and adjust as necessary.

3. Lesson number three: Problems are friends. Change requires encountering problems. Unless problems are encountered, a project may be worked on only superficially.

4. Lesson number four: Vision and strategic planning come later in the process, not at the beginning. People need to get their hands dirty before they can articulate their vision, make it more focused, then use it as a guide.

5. Lesson number five: Individualism and collectivism must have equal power. The problem is to continue to build collaboration while protecting the value of individualism. This is the ability to develop personal visions so that people can interact with others about shared visions while still holding their individual vision.

6. Lesson number six: Neither centralization nor decentralization works. All productive change is somewhere in the middle of the continuum. On one end of the continuum is over-control, on the other is chaos. What seems to work is the interaction of control and planning with decentralization and chaos.

7. Lesson number seven: Connect with the environment. People who are trying to bring about local change need to be plugged into a wider network of change agents in order to truly create a culture for change.

8. Lesson number eight: Every person needs to be his or her own change agent. Teachers, especially, need to be their own change agents. Changes will continue to come at us, and we need to rely on our own personal vision-building, our own effectiveness, in coping with change (Fullan, 1992, pp. 3-4).

The Concerns Based Adoption Model and its instrumentation is one effective means through which to study processes of implementation with minimal expenditures of time and observation. The findings from the research support the basic assumptions underlying the CBAM model, namely, that change:

1. is a process and not an event
2. is made by individuals first, then institutions
3. is a highly personal experience
4. entails developmental growth in feelings and skills (Hall, 1979)

The model itself describes the stages of concern during an innovation by establishing a name and numeral for each of the individual stages. The seven identified stages are awareness, informational, personal, management, consequence,

collaboration, and refocusing. CBAM suggests that as people are subjected to an innovation, they progress through these identified stages until they ultimately refocus and explore the benefits from the innovation itself.

The change process and the efforts to facilitate change are important in the continuing development of teachers. One model of staff development includes the assumption that efforts must first initiate some form of change in the beliefs, attitudes, and perceptions of teachers before the actual desired curriculum or instructional innovation can be addressed (Harris, 1980).

Lasting change depends on clear demonstrations of recommended practices. A teacher trying to learn a new skill or concept must be able to visualize it in practice (Joyce & Showers, 1983).

Changing Assessments

Over the past decade, educators and the public have become aware of the importance of educational outcomes and high achievement standards. It is insufficient for accreditation purposes, for example, for educators to build the proper facilities, buy the right textbooks, have low student/teacher ratios, or have enough books in the library. Now, these and other process variables are to be used in the right combinations to produce the desired product-measured student learning (Stiggins, 1988).

In the pursuit of better education, educators have been rethinking the educational process. Questions for consideration include the following:

1. What is it that we want students to learn?
2. How do we want students to learn?
3. How do we know when students have learned?

Since students have different learning styles and assessment has many purposes and audiences, teachers must use a variety of assessment measures to give an accurate picture of student progress.

Implicit in much of the recent discussion about assessment is the assumption that students and teachers are influenced by what is assessed--that students learn and teachers teach what is tested for. Therefore, making assessment congruent with desired curriculum and instructional outcomes would facilitate their attainment. It is the congruence of assessment techniques with desired outcomes that makes assessment authentic (Lawrenz, 1991).

Educators must examine alternate assessment techniques with caution. There is an inclination among proponents to regard alternative assessment as suitable for all purposes including diagnosis, selection, and accountability at all levels. Alternative assessment may prove to be an outstanding indicator of an individual child's academic progress, and prove fairly useless for other purposes.

Educators must decide whether comparisons are what they seek in alternative assessment or whether they prefer to use the approach for other more individualized purposes. In structuring alternate assessments, it is easier to propose the outcomes desired than it is to set the criteria and establish the performance levels that are represented by various achievements (Maeroff, 1991).

Leaders in education are advocating more responsibility for teachers in setting educational goals and developing ways to reach them (Caldwell & Wood, 1992; David, Purkey & White, 1989; Glickman, 1992; Lieberman & Miller, 1990). Assessment is an important part of a teacher's professional behavior. Stiggins (1991, p. 535) asserts, "Teachers make decisions about how to interact with their students at the rate of one every two to three minutes, and they base those decisions on their assessment of student learning."

The movement toward more authentic and equitable assessment of students has been called for by reports from many educational agencies. Minnesota, Wisconsin, Indiana, California, Michigan, Kentucky, Vermont, and other states have developed initiatives to reexamine current methods of assessment available to the nation's teachers and students (Donovan, 1988). The educational leadership of the State of Iowa has made a similar commitment. Lepley (1990, p. 2),

the Director of the Iowa Department of Education, states that

> A long-standing goal of education has been to bring out the best in every student--to help each person reach his or her potential. . . . The State Board of Education is committed to involving a broad array of Iowa educators in defining those student results during the next year.

Eva Baker (1991), Director of the National Center for Research on Evaluation, Standards and Student Teaching (CRESST), warns that the value of replacing multiple choice achievement tests with more open-ended exams and assessments is still unknown. A review of literature or performance assessments found that less than 5% contained empirical evidence to support claims of success. Many educators may wrongly assume that such tests are better motivators for student learning, and while proponents of alternative assessments intend students to use critical thinking skills, no proof exists that they do. Baker believes that valid performance-based assessments can be developed; however, they take time, conceptual models, and careful empirical work (Baker, 1991).

In the assessment alternatives being developed, curriculum and assessment form a common, articulated concept of learning. Instruction and assessment are complementary, two faces of a unified classroom experience. Assessment includes more than stand-alone tests; it is immersed in

instruction. Its primary purpose is to inform teachers of decisions about instruction and to increase the student's ability to self-assess (Wiggins, 1989).

Assessment schemes should be carefully designed to meet mutual instructional goals of the teacher and the learner. Thus, meaningful assessment should serve as a catalyst for the improvement of school programs.

Educators generally accept that the close alignment of the written, taught, and tested curriculum helps teachers better address the fundamentals of quality instruction in a systematic and consistent manner (Brookover & Efthim, 1982). This alignment helps educators go beyond coverage of curriculum material to the mastery of the intended curriculum. Fully meeting this goal requires the determination of the essential tasks that students must perform and a decision on measurement strategies. By utilizing a model or program of measurement in which lessons emerge from expected outcomes, teachers can adjust instruction through formative assessment to promote student mastery. Interactions between the assessor and student are critical in assessment procedures that focus on the student's ability to justify answers and respond to follow-up or probing questions. Authentic Assessment Evaluation is such a program; it is designed to reveal student achievement to the examiner, and also show the test-taker the actual

expectations and standards of the discipline (Wiggins, 1989, 1991). Authentic Assessment Evaluation includes two key questions about all measurements of student achievement: What does this assessment tell students about outcomes that are valued, and What is likely to be the effect of our assessments on students? Authentic assessment uses measurement methods that reflect precisely defined achievement targets.

How teachers currently evaluate students has caused researchers to reexamine methods of measurement. Evaluation consists of tests, measures of accountability, standards, criteria, incentives, grading, feedback, and assessment. Each of these plays an important role in the evaluation of student performance. Educators utilize each of these to a degree in their classrooms; however, what they fail to do is reexamine how these elements of evaluation can work together. Natriello (1991) developed an eight- step conceptual framework that explains the interrelated properties of the elements of evaluation. They include:

1. Establishing the purpose for evaluation
2. Assigning tasks in accord with that purpose
3. Setting criteria of expectations
4. Setting standards of performance
5. Sampling information of performance
6. Appraising performance

7. Providing student feedback

8. Monitoring evaluation results (Natriello, 1991)

Natriello observed that teachers commonly assign tasks that can be evaluated easily. They do not often assign more difficult tasks because of numbers of students, time constraints, lack of knowing how to implement, or simply not believing in the benefit of alternate forms of assessment.

Some educators believe that alternative testing models may provide the key to solving today's problems in education. A call for two transformations in U.S. education have been suggested. They include a shift from tailored curriculum where students memorize and regurgitate bits and pieces of information in multiple choice tests to a thinking curriculum in which students use their creativity and reasoning. The second transformation would include a move from aptitude to effort-oriented education, dropping the notion that individuals have an aptitude level from birth, and instead operating under the philosophy that a student can achieve any level of learning and ability through hard work (Resnik, 1991).

When an educational problem persists despite the well-intentioned efforts of many people, the problem may have been improperly framed. Assessment in education has clearly become such a problem since every state reports above-average scores on norm-referenced achievement tests, and

most agree that such tests should not drive instruction. However, the number and influence of such tests have increased (Mullis, 1990).

Resnick and Resnick (1991) envision an assessment system that will more accurately measure new learning objectives, such as higher-order thinking and problem-solving skills. The goal is an assessment system requiring students to demonstrate mastery by giving "performances," to show that they can actually write passages or reason through math or science problems. These tests, typically called "authentic" or "performance-based," are tied directly to the curriculum. The reason for this alternative type of assessment is that the tests being widely used today are fundamentally incompatible with the kinds of changes in educational practice that are needed to meet current challenges (Resnick & Resnick, 1991).

To avoid continued testing of meaningless performances, educators need a clearer conception of authentic academic achievement. Through the examination of the differences between trivial school tasks (e.g., giving definitions of biological terms) and more meaningful performance in non-school settings (e.g., completing a field survey of wildlife), educators can develop criteria for authentic academic achievement. Authentic cognitive work involves disciplined inquiry that integrates and produces knowledge,

rather than reproduces fragments of information that others have discovered. It is therefore apparent that the fundamental purposes of these new authentic methods are grounded not in the measurement process, but in educational goals, meaningful outcomes, and curricular and instructional programs to promote lifelong student achievement and learning (Newmann, 1991).

Alternate Science Assessments

Unhappiness with traditional approaches to both the assessment of science abilities and the design of instructional programs has led practitioners to examine alternate approaches to student measurement. Science is a complex discipline with many domains. Researchers at the University of Iowa have identified five principal aspects within science: concepts, processes, creativity, attitudes, and applications. These domains are present in science courses but rarely evaluated. Data indicate that presently more than 90% of typical science test items are designed to test only the degree of student retention of basic facts. The Iowa Science Assessment Package is an attempt to widen the assessment scheme to include a more complete science program (McComas & Yager, 1989).

Direction 2000 began in 1988 when the Littleton, Colorado, Public School District adopted a restructuring plan. One of the many recommended changes that the school

district implemented is graduation based on demonstration of what students actually know and can do. In science education, Littleton uses an integrated approach utilizing units that develop students' skills of observing, communicating, comparing, ordering, categorizing, relating, inferring, and applying. These units are closely related to real life and culminate in self-directed experiments where students have the opportunity to design, implement, interpret, and analyze an experiment of their choice (Westerberg & Brickley, 1991).

The National Science Teachers' Association in Science Education Initiatives for the 1990s include as the first two of six major curriculum development initiatives (a) development and implementation of more unified, in-depth, hands-on science curriculum for preschool to high school students, and (b) development and utilization of evaluation and assessment tools that measure student achievement of higher order thinking skills (National Science Teachers' Association, 1988).

One way to assess student abilities in science is by observation. Teachers are always observing the students in their classes, but very few teachers combine observing with assessing their students. With the focus of authentic assessment on the totality of student performance in the classroom, an excellent way to evaluate student work in the

lab or in the class is that of keeping records of observations the teacher has made (Tamir, Yager, & Blunk, 1991).

Innovative assessments in science classes today include performance exercises; portfolios; open-ended, pencil-and-paper tests and quizzes, and multiple-choice items probing general understanding of conceptual and reasoning skills. Promoting systemic change at the classroom level is the central thrust of the Educational Testing Service/University of Delaware Science Education project. The major focus purported by the project is assessment directed by learners and teachers towards improving learning and teaching.

Specifically the ETS/UDel Science Project addresses the question, "Why Instructional Assessment, Teacher Development, and Middle School Science?"

> We have been especially interested in teachers' professional development as a key component in systemic change for a couple of reasons. One reason for this interest is that teachers are a major, essential part of the educational system, and sustained, systemic change will require teachers working together towards that change . . .
>
> We desire students who can, as citizens, be life-long, independent, responsible learners, and teachers must model learning processes in the classroom and involve students in them . . .
>
> We identified middle school science as an appropriate area in which to work for several reasons. A key reason for choosing science as a subject matter area in which to work is that instructional assessment finds a natural ally in the notions of scientific inquiry and methodical reflection on learning and understanding found in good science education. Pre-high school grades are pivotal for science learning, since students' attitudes about an academic preparation

> for choices in the area of science are largely made before ninth grade. (Gong, 1991)

Rethinking the methods that we currently use to assess students has led to what today has become known as Authentic Assessment, an assessment method that occurs concurrently with instruction. The concepts of dividing the curriculum into expected student outcomes and the creation of tasks to achieve mastery in those outcomes make evident the criteria and standards of the task of the curriculum. This allows a thorough preparation and accurate assessment by the student (Wiggins, 1989).

Authentic Assessment

Wiggins (1990) has examined the role of assessment in the learning process. He advocates the use of instructionally appropriate assessment measures and processes called Authentic Assessment.

Wiggins provides eight descriptors of Authentic Assessment:

1. Composed of tasks which we value, and at which we want students to excel--tasks worth "teaching to" and practicing. Tasks simulate, mimic, or parallel the kinds of challenges facing adults or the worker in the field of study.

2. Constructed of "ill-structured" challenges that require a repertoire of knowledge--knowledge in use--as

opposed to mere recall, recognition, or "plugging in" of a ready-made algorithm or idea.

3. Appropriately multi-staged, leading to (refined and revised) products or performances.

4. Focused on the students' ability to produce a quality product and/or performance. Important "habits of mind" are thus necessary (and may thus be directly assessed as) means to the final word.

5. Sufficiently de-mystified and known in advance to allow for thorough preparation and the possibility of self-assessment.

6. Adapted tasks and criteria are sufficiently adaptable to student styles and interests, whenever possible and appropriate.

7. Evaluation based on judgment in reference to clear, appropriate-to-the-task-done-well criteria (as opposed to that which is more easily observed and/or scored).

8. Limited rarely to one-shot, one-score tests with no interaction between assessor and assessee. Often the assessment focuses on the assessee's response to questions or ability to justify answers and choices made.

Wiggins (1990) discusses the term "authenticity" in test design and offers the following in terms of test tasks, test context, criteria, standards and appropriateness.

Test Tasks (What work is worth having students practice and Master?) (a) Duplicate or parallel the "tests" facing the professional in the field, the consumer, or the citizen: appropriately "ill-structured, requiring a repertoire, knowledge-in-use, judgment," (b) A test with "face validity."

Testing Context (Are the setting and constraints authentic, given inevitable limitations of valid, large-scale assessment?) (a) Duplicates or realistically simulates the "ecology" of authentic tests in the field: the time and resource constraints are realistic; there is an ability to appropriately plan, execute, self-assess and revise.

Criteria (Are the essential aspects emphasized in scoring?) (a) Duplicate or similar to the criteria used in judging adult performance at the same (or similar) tasks, (b) Essential traits or qualities of successful performance are emphasized and more heavily weighted, relative to other qualities (instead of emphasizing easily-observed/easily-scored, but less important errors).

Standards (How demanding of quality should teachers be? How "good" is "good enough"? What is exit-level quality work?) (a) Top scores are equated to larger-world mastery or next-level standards (e.g., entry-level ability in jobs, college, next level of school, apprentice-level work),

(b) quality is required in products or performance, not just "correct" answers.

Appropriateness (Does the proposed assessment match students, curricular aims and resources?) (a) Alignment with curricular and instructional goals: content validity, (b) feasible with minor modifications within current school structure.

Rethinking assessment according to Wiggins (1990) involves the thorough examination of current educational measurement procedures. He outlines the issues involved by posing six essential questions that must be addressed. These include:

1. What might assessment look like if we practiced what we preach--i.e., we tested all the habits of mind and abilities we profess to value (instead of the easily-tested)?

2. What if our aim were to evaluate students as effective intellectual performers (vs. educated spectators of <u>other</u> people's past performances)? How are students "tested" now in performance-based courses (such as art, music, debate, voc. ed)? What are the implications if our aim is to see if students can <u>use</u> knowledge to do math, history?

3. What if we expected and demanded that all students, no matter what age, course or "track," had to produce high-quality, independent work?

4. How can we set standards to insure that our graduates are prepared for a world of high expectations? How can we set standards that strike us as "authentic" and worth getting each student to meet? What are we willing to guarantee?

5. How will we insure that the quality of local assessment is high--valid, reliable, and effective in improving student performance--while also able to gain the trust of parents, Board members and state officials? To what extent must teachers agree on standards for assessment design, use, and feedback that they collectively agree to uphold (vs. allowing individuals the freedom to assess and grade as they see fit)?

6. What must our daily, weekly, monthly, semester, and yearly calendar look like to support labor-intensive, judgment-based assessment?

Wiggins asserts that the answers to these questions lead to new standards and criteria that will allow schools to create what he has coined as "value-added" authentic achievement. The major theme purported in Wiggins' authentic assessment scheme is that educators must constantly devise methods of measuring students on the

abilities that the educators profess to value instead of the easily tested (Wiggins 1990, 1991).

Summary

The change literature suggests that change is a process, and efforts to facilitate change are important in the continuing development of teachers. Understanding the change process of teachers is vital for the successful implementation of a new educational strategy or approach. Adult learners differ in important ways. They react differently to educational environments, preferring various levels of structure, task complexity, attention to personal needs, feedback about performance, and risk-taking (Bents & Howey, 1981).

The role of assessment in the learning process is also currently being reexamined. The search for more instructionally appropriate measures and processes has led to the emergence of alternate forms of assessment. Among the methods being promoted is the Wiggins Authentic Assessment approach. This approach is composed of valued tasks, and focuses on the student's ability to produce a quality product and/or performance. Standards of quality are closely defined and are appropriately matched with curricular and instructional goals.

If educators are serious about improving student assessment and reexamining its role in the instructional

process, then they must encourage the ongoing debate to identify the best methods of measuring student learning. It will be through this context that more valid and reliable alternative assessments will be created.

This study examines the results when an educator implements a new approach of student assessment, and records the effects on the teacher resulting from that change.

Chapter 3

METHODOLOGY

In this chapter I describe the methods and procedures used in this study to investigate the changes that occur in a teacher as she implements Authentic Assessment, a new strategy of measuring students for her. The chapter is divided into six sections: (a) Qualitative Research, (b) Background, (c) Subject of Study, (d) Research Questions, (e) Collection of Data, and (f) Data Analysis.

Qualitative Research

Qualitative research is referred to as field research, naturalistic, ethnographic, phenomenological case study, interpretive and descriptive (Bogdan & Biklen, 1982) conducted in a theoretical framework. The findings are contextualized within a social, cultural, and historical framework. Research reports disseminate the knowledge which informants provide taking into account ethical problems. Finally, the researcher monitors the dissemination of materials and provides feedback (Burgess, 1984).

Background

I chose Denison Community School District, a district with 1568 students in kindergarten through twelfth grade, for this study. The school district began to study

Authentic Assessment Evaluation during the 1989-90 school year. I selected and trained one sixth-grade science instructor in using Authentic Assessment Evaluation. I made no attempt at random sampling since students were prescheduled in classes based on their choice of various elective studies.

In this study, I describe patterns or trends between Authentic Assessment Evaluation, which is reciprocal, developmental, process oriented, reflective, and holistic, and the professional development of the teacher who implemented it. Since Authentic Assessment Evaluation involves cognitive and affective domains, I focused on the teacher as a learner through the process.

The training design included theory, demonstration, and practice. The teacher in this study attended seminars and training sessions by instructors knowledgeable in higher-order thinking skills and alternate methods of assessment. District-supported inservice on assessment alternatives included a five-day pre-school workshop conducted prior to the 1991-92 school year as well as a cooperative county-wide inservice solely dedicated to the theme of Assessment/ Transformation. The support structure, i.e., District Thinking Skills/Assessment teams and Staff Development teams of the professional development paradigm, provided training and support.

In the summer of 1988, the curriculum director and four teachers, two from the middle school (one of whom is the subject of this study) and one each from the elementary and high school, attended a Thinking Skills/Assessment training session in San Francisco and later that year attended a follow-up session in West Des Moines.

A team of four teachers and the district's curriculum director attended a presentation on Authentic Assessment by Grant Wiggins in Cedar Rapids in January, 1990. In Fall 1991, the teacher who is the subject of this study and two other teachers attended a three day seminar on Assessment Alternatives in Phoenix, Arizona.

Subject of the Study

The teacher I chose as the subject for this investigation has been a sixth-grade instructor for 23 years, 5 in a rural, private school setting, and the remaining 18 in the Denison Community School District. When the district transformed its structure from a junior high concept to a middle school concept seven years ago it shifted from a self-contained classroom philosophy in sixth grade to a departmentalized approach.

The teacher graduated from Iowa State University in 1969 with a Bachelor of Arts in Elementary Education. She continued her professional development and graduated from Drake University in 1988 with a Master of Science in

Education degree. Since that time she has continued to attend more graduate level science classes, and at this time she is on the MA + 15 schedule.

In informal conversations with the teacher's colleagues and principal it was learned that she is looked upon as an educator who continually tries to upgrade her skills in teaching with the end result being that she maintains a well managed, learning environment in her sixth-grade life science classes.

Research Questions

This study was to answer the following research questions:

1. What are the experiences and perceptions of a teacher as she implements Authentic Assessment in sixth grade science?
2. What student changes are observed during the treatment time period in which the Authentic Assessment Process is implemented?

Collection of Data

I began the investigation by conducting an initial interview with the teacher. This interview was somewhat structured but carefully designed to leave room for teacher spontaneity. The interview session was videotaped so that

it could be reviewed throughout the study to attain better description and comparison. "Interviewing is the preferred tactic of data collection when . . . it will get better data or more data or data at less cost than other tactics (Dexter, 1970, p. 11). This reflective interview yielded insight into the teacher's thoughts, feelings, and expectations before she began the Authentic Assessment implementation process.

I used a semi-structured interview to elicit open-ended, detailed data. Burgess (1984) describes the semi-structured interview as a "conversation with a purpose" (p. 107). I explored a few general topics to help uncover the participant's meaning and perspective but otherwise respected how she framed and structured the responses. A fundamental assumption was to allow the participant's perspective on the social phenomenon of interest to unfold from the participant's point of view, not from my point of view (Spradley, 1979).

The use of semi-structured interviews assumes that the participant has developed specific hypotheses or beliefs concerning the issues or situation that is to be explored (Merriam, 1989). In constructing the interview, I developed a series of broad, open-ended questions to explore the major areas of inquiry. In the interview I focused on the

subjective experience of the participant in an effort to identify her beliefs and values in the situation. The participant's responses to the major areas of inquiry provided the basis for the criteria of relevance in the data obtained.

I employed effective ways to establish rapport with the participant. I followed Spradley's (1979) recommendations to take a few minutes to intersperse casual conversation throughout the interview to contribute to a positive outcome. In addition, Spradley (1979) advises the researcher to address the following issues: the purpose and intent of the interview, confidentiality, logistics, payment to the respondent, and the final content of the study and its availability to the respondent and others.

The study took place during a nine-week time period. The actual days were numbered and referred to in the study as day 1, 2, 3, through day 45. The four classes of sixth-grade life science met the first four periods of the day from 8:30 a.m. to 12:50 p.m. Each period was 45 minutes in length with a lunch period of 25 minutes before period four began.

I collected data through a variety of qualitative approaches and developed detailed descriptions for this case study. The intent of the qualitative investigator is to get

close physically and psychologically "to the phenomena under study" (Merriam, 1989). I satisfied this intent through:

1. The teacher's initial reflective interview
2. The teacher's daily personal journaling
3. Periodic video tape recording of each of the four classes (Three recordings of each class will be analyzed for a total of 12 during the treatment)
4. Periodic audio taped telephone conversations throughout the study
5. Analysis of periodic memos and notes submitted by the teacher
6. Classroom observations by the researcher--A minimum of twice a week personal observations of a class period for 7 of the 9 weeks (14 total observations)
7. Student interviews at the end of the study
8. Other documentation such as examples of student work/projects, lesson plans, and evaluation instruments

Data Analysis

In this qualitative single case study design, I incorporated data gathered through observations, interviews, surveys, audio, and videotapes documenting the treatment and control groups throughout the study. I also used partially structured interviews with the teacher involved in the study

to obtain additional data and to verify information obtained from actual classroom observations. These periodic interviews with the instructor provided insights into characteristics and behaviors that were not initially identified in the classroom observations.

During the interview process, data collection and data analysis occur simultaneously (Merriam, 1989; Spradley, 1979). Analysis began with the first interview and was refined throughout the entire interview process. Once completed, I organized the interview data to allow for intensive content analysis. The data were "unitized" (Lincoln & Guba, 1985), which involved the process of reducing data into the smallest piece of meaningful information that could be interpreted to reveal relevancy to the study. I wrote each unit of information on an index card and systematically sorted into categories or themes that reflected the purpose of the study (Merriam, 1989).

By comparing the categories of data, I generated statements regarding relationships. This comparative method of data may be thought of as a series of steps (Glaser & Strauss, 1975) to collect the data, identify the issues, and determine if there were emerging characteristics or categories of focus and then arrange them into core categories.

I developed major categories from the data and assigned a code to the various responses. Simultaneous with the writing of the analysis, I continued to review the sample, code, and rewrite. Thus, the constant comparative method of data analysis relied upon continuously compared all the data (Guba & Lincoln, 1981).

Kidder (1981) identified three validity/reliability tests appropriate for descriptive case study designs: construct validity, external validity, and reliability (cited in Yin, 1984).

Construct validity (Kidder, 1981) refers to the challenge of developing an "operational" set of measures that can be used to collect the data (cited in Yin, 1984). To meet the requirement of construct validity, selected measures must reflect the characteristics or traits of interest.

External validity involves generalization beyond the immediate study. Differences in the types of generalization allowed comprise an important distinction between inferential and descriptive studies. In case studies, only analytical generalizations are allowed. Analytical generalization involves "striving to generalize a particular set of results to some broader theory" (Yin, 1984, p. 39). Validity must be assessed in terms of interpreting the

investigator's experience, rather than in terms of reality itself (Merriam, 1989).

Reliability refers to the possibility that another investigator could replicate the study with similar results. The goal of reliability is to minimize error and bias in a study (Yin, 1984). Qualitative research does not seek to isolate laws of human behavior; instead it strives to describe and explain the world as those in the world interpret it. Consequently, since there are many interpretations of what is happening, there exists no benchmark by which one can take repeated measures and establish reliability in the traditional sense (Merriam, 1989). It is impossible to have internal validity without reliability; therefore, a demonstration of internal validity amounts to a simultaneous demonstration of reliability (Guba & Lincoln, 1981).

Limitations and Delimitations

The findings of this study were limited by the classroom environment designed to accommodate Authentic Assessment Evaluation. The study was limited to a rural, Midwest school in Iowa and to a specific population of four sixth-grade science classes and their students. The study was also limited by virtue of its focus on a single assessment methodology.

Another limitation of the study was the response effect. Response effect refers to the tendency for respondents to give distorted or exaggerated responses (Merriam, 1989). Spradley (1979, p. 58) reported strategies to provide a non-threatening interview "into which the researcher slowly induces new elements to assist informants to respond as informants." Spradley notes the importance of establishing trust and rapport early in the interview process by (a) addressing the purpose and intent of the interview; (b) assuring confidentiality of the respondent; (c) explaining the logistics of the interview in regard to time, place, payment, etc.; and (d) relating the availability of the final content of the study to the respondent. I took these steps to establish rapport before each interview.

The study was limited to one teacher schooled in Authentic Assessment Evaluation.

Chapter 4

ANALYSIS OF DATA

An Overview of the Study

Zimpher and Ashburn (1985, p. 16) assert that "the process of becoming and being a teacher is a complex one, involving the interactions of people, curricular events, and site." Rather than focusing largely upon the empirical perspective, they argue a more useful way to study teacher's professional development "can come from the broader context of multiple conceptions of the world, their philosophical traditions, and a concern for the epistemological referents that accompany the study of human endeavors" (Zimpher & Ashburn, 1985, p. 25). The purpose of this chapter is to present a comprehensive description of the observed effects upon the teacher while implementing a new process (Authentic Assessment) in a sixth-grade science class.

I collected the data presented in this chapter through the analysis of teacher and student interviews, the teacher's personal daily journal, video/audio transcripts, student work projects, and personal observation notes taken by the researcher. I have added words or phrases in brackets to clarify the origin of the response for the reader.

Goodson (1991, p. 69) argues that "in understanding something so intensely personal as teaching, it is crucial that we know about the person the teacher is." The purpose of this section is to present a comprehensive overview of the personal background, educational background, and personal perspectives of the subject of the study.

I collected the data presented in this section through the initial reflective interview. The underlined words or phrases in the narrative statements are words or phrases the teacher emphasized.

The Teacher

Personal Background. The teacher (Collette) grew up in rural Iowa. She attended parochial schools through the twelfth grade. She is married and has five children ranging in age from 1 to 19 years old. Her family lives in the country on an acreage, has animals, and lives as she describes in "a kind of perfect environment for a life science teacher."

Educational Background. Upon graduating from Kuemper Catholic High School, Collette entered Iowa State University and majored in elementary education. After graduating from college she began teaching sixth grade in a self-contained classroom. For the past 22 years she has been a sixth-grade

teacher, the last 8 being strictly the life science teacher. After 17 years of teaching, she returned to school to pursue a Master's Degree in Effective Teaching, graduating from Drake University in 1988. Her Master's Degree program was the catalyst for her to realize that "there was a whole new world out there for me in terms of what was out there in research . . . what was out there in terms of what was going on in education . . . and in terms of my professional career, it was a real turning point for me."

Collette's Classroom

Collette's classroom is on the second floor of a three-story building constructed as a high school during the early 1930s. In 1969 it was changed to a Junior High School and later to a Middle School (grades 6-8) serving the Denison District. Upon entering her classroom, an observer would have no trouble recognizing it immediately as a science room. The front of the room has a sink, table, and lab counter arrangement. On the front chalkboard is a poster describing Classroom Rules for Science. Three simple rules are listed: (a) be in your seat when the bell rings; (b) have all necessary materials, text, notebook, pencil, and paper; and (c) be courteous to others, by listening, sharing, and helping. On the table are an aquarium and various green plants and piles of resource books.

Large windows to the south allow an ample amount of light to enter the room. More plants, birds' nests, and insect hives also hang from the ceiling.

Across the ceiling a string is stretched north and south depicting a time-line from the beginning of the earth 5,000 million years ago, through the various era's Mesozoic, Cenozoic, and Precambrian up to present day.

The rear wall of the classroom is packed with more storage, file cabinets, and science resources. The north wall is a bulletin board filled with student drawings, depicting the Kingdom Animalia. Cupboards filled with flasks, balances, microscopes, and dissecting instruments line half the wall.

Six tables (four student chairs at each) are aligned in two rows in the classroom. Each table has a small pile of resource books on it, as well as glass jars labeled "survey sets" with earthworms, clamworms, sea anemone, and moon jellyfish in them for students to observe. It is definitely a classroom that one would easily recognize as devoted to science.

Background for the Study

Prior to implementing authentic strategies in her classroom, Collette realized that her methods of instruction and assessment needed to change. She felt that she was not reaching some of her students with traditional methods of

instruction and assessment. Collette was searching for a new direction, a better way that was valid for her as well as her students. At the same time she was not ready to abandon content teaching completely.

The workshops she attended reinforced her thinking that she needed to reevaluate how she was currently teaching and assessing her students. It was during this period of time that Collette became aware that it was no longer necessary that only the teacher know everything. Now she felt it necessary for her students to take a greater role in their learning.

As authentic assessment strategies became a part of Collette's teaching, she found herself beginning planning with assessment. She began to identify the outcomes she wanted her students to exhibit first, before she designed the actual lessons. Collette concurrently experienced a change in the method in which she instructed her classes. She no longer felt she needed to be center-stage and cover everything. Utilizing authentic assessment allowed Collette to step back and act more as a facilitator. Collette viewed her students as being more actively involved in their learning.

> No longer do I need to spoon feed my kids--before authentic assessment I was in charge of what and when they learned. Now the learning is coming from the students themselves as I act more like a guide. (Teacher, Post-study Interview)

Assessment Criteria Based on Teacher Perception

The process of identifying these 10 benchmarks began as I examined each data sample and highlighted what I thought might prove to be a significant word, phrase, sentence, or idea later on in the data analysis. These highlighted samples were then transferred on to index cards and categorized into general areas. After numerous examinations of the data samples, the number of general areas were narrowed, to ultimately yield what I identified as the 10 Assessment Criteria Benchmarks. The first 9 of these benchmarks are based on teacher perception and the last is based on student performance. These 9 criteria emerged as I continually sifted through the data collected. In order to emphasize recurring themes, I chose to present the analysis in the following order by assessment criteria.

1. The degree of risk-taking by the teacher
2. Teacher perceived barriers/problems
3. Teacher positive reinforcements/rewards both direct (measurable outcomes) and indirect (more subjective)
4. Teacher intrinsic motivation
5. Teacher's perception of student level of responsibility toward their own learning
6. Teacher's self-analysis/self-assessment
7. Teacher's desired outcomes

8. Teacher's perception of student's success/achievement
9. Teacher's perception of change in climate/culture
10. Teacher's subjective assessment of student performance

Risk-taking

This item addressed the issue of the degree of risk-taking that was either perceived by the teacher herself, or observed by me during the study.

In the initial reflective interview, while reflecting upon her professional career as an educator, Collette described the change that occurred in her teaching after beginning her Master's program by stating:

> Before that, I was an adequate teacher. I did my thing. I delivered my information to the kids. But after that I, I don't know, I did my Master's thesis on higher-level thinking skills using the medium of cooperative learning, and that forced me to come back to my classroom and really try to do some different things. (Teacher, Initial Interview, November 1991)

Experimenting with allowing her students more and more responsibility for their own learning began early into the study. At one point, teaching the Digestion Unit, she challenged her students by having them look at themselves as engineers in order to solve the problems associated with ridding the human body of wastes. She began the discussion by saying:

> Imagine that you are an engineer, building a digestive tract. You can put in five little doors to open and close. Where would you put them? (Teacher, Personal Journal, April 1992)

A lively discussion followed and the students, without knowing exactly how or what they were doing, correctly identified the placement of the five sphincter muscles in the human body.

Allowing her students to work cooperatively on projects and problem solving activities also meant that Collette felt she was less in control of the learning situation than she had been in her "stand and deliver" teaching. She slowly allowed her students more and more freedom in her classroom. The first week of her Nutritional Unit saw her assign a "paired project" with only a teacher-made guide sheet for students to follow:

> I listed 15 nutritional diseases on the board and the students signed up by pairs to research one. Guide sheets helped students focus on three areas. (Researcher, Personal Observation, April 1992)

Collette began to feel her role slowly changing. Students working together in problem-solving pairs began to look to the teacher as a reinforcing agent and guide rather than one that knows all the answers.

Into the second week of the Nutrition/Digestion Unit, Collette felt comfortable enough to challenge her sixth graders by asking them to accomplish the following:

> . . . to create a non-fiction booklet describing the workings of the digestive system. The audience will be

> third or fourth graders. (Teacher, Personal Journal, April 1992)

The unique challenge of this particular lesson was that the students were not only asked to research and describe the human digestive system, but they also needed to simplify the concept enough so that third or fourth graders would be able to comprehend it. During one of my personal observation days, I witnessed the sharing of the booklets they had produced with each other. The broad scope of their imaginations was very evident as each student read and explained their own Digestive Booklet.

Although both Collette's and her students' comfort level with the newly introduced assessment method was improving each day, she soon learned that motivating and timing are still essential to good instruction. Before assigning her first project that was going to be assessed by utilizing a predesigned rubric, she was careful to insure that her students were ready for yet another new way of doing things. At the end of the week she had intended to introduce the rubric to her class on the following Monday. She delayed an extra day because as she explains:

> In light of discussions, I decided to wait with the rubric until Tuesday. I managed to lower their level of concern and create some positive feelings for the project. I did not want to dampen that attitude yet, with a list of things to do. (Teacher, Personal Journal, May 1992)

In the category of the perceived degree of risk-taking by the teacher, I discovered that, as acknowledged by Collette during the initial reflective interview, her Master's Degree program actually acted as a catalyst for her to think differently and become more open to experimenting in her classroom. This, coupled with her learning more about alternative forms of assessment, made her ready for the challenges of introducing a new assessment method to her students. As the study progressed she became less anxious before the actual changes were to be introduced, and seemed more confident in her changing role from deliverer to facilitator.

Perceived Barriers/Problems

Collette realized that in the process of change there would undoubtedly be barriers/problems that she would sometime need to address. Before the actual study began, Collette relayed some of her perceived barriers to the learning process. These included the following comments:

> We cannot compete with all the different kinds of media and entertainment that these kids are bombarded with, and so talking to them and just delivering my little lesson for the day just does not cut it with kids today. We have to find better approaches or we are not going to educate them. (Teacher, Initial Interview, November 1991)

> My biggest frustration, total, is not the kids. It really isn't. My biggest frustration is one of time, and if I could have the time to prepare the lessons the way I want to . . . to do more individual things with

> students . . . if I could have one thing, it would be time. (Teacher, Initial Interview, November 1991)

These two perceived problems or barriers (time and competing with all kinds of media) are not uniquely associated with a teacher trying to implement a new assessment method into her classroom. However, it was evident to me that Collette was searching for better methods to reach her sixth graders from the very beginning; and that the amount of time that may be required to perfect this new method was definitely a concern.

Besides the problems of finding better approaches to reach the students in today's classrooms, and of not having enough time to accomplish all she would like to as a teacher, Collette also shared the concern that she wasn't sure she, as an educator, wanted to surrender control.

> . . . anybody who has been in the classroom for twenty years and has been up there in front of the class delivering her lesson there, it is a matter of control (traditional teaching style). (Teacher, Initial Interview, November 1991)

Collette sensed that the methods that she previously had used in her classroom may need to be changed. She might have to do business differently in the future and that would undoubtedly mean some changes in the control of her classroom. Instead of the teacher delivering and controlling everything, now the teacher would conduct her class as the music teacher, the athletic coach, or the

vocational teacher. The classroom teacher would help the student "play the game" of the expert (Wiggins, 1989).

Assessing students fairly is an ever-present problem. As Collette began to look at an alternate assessment method, she naturally was again confronted with the issue of judging her students' performance:

> At some point I am going to have to put a grade on it. How do I fairly evaluate what everyone has done? How do I make that fair for the high ability student . . . compared to the special education student (both who are working to their capability)? (Teacher, Interview II, March 1992)

Evaluation must be based on clear, appropriate, and well-defined criteria. The problems associated with designing these activities/tasks so that they accomplish the outcomes desired are a real concern for the teacher.

One of the methods of assessing her students experimented with by Collette was to design rubrics for her students. These rubrics would constitute an established guideline for student performance, thus acting as the standard. Her experiences with rubric design led her to explain:

> I just thought it gives the kids a lot more of a concrete idea, it gives them a lot better thing to shoot for . . . I see a problem, these rubrics take a long time to write. I am sure I will be spending some time on rubrics, quite a lot of time, but . . . it would have to give me a good idea of where I wanted those kids to end up. (Teacher, Initial Interview, November 1992)

The actual task of the designing of rubrics for her lessons yielded several by-products. She became increasingly more sure of exactly what she wanted the finished products to look like. She began to focus in on the most important criteria she wanted included in the students' final product.

Another part of the authentic assessment method is to have students work cooperatively in groups much as people in real life do when confronted by a problem. These problem-solving group activities also presented concerns for Collette as described below:

> I know what I want for the kids in terms of learning, but setting up fairly valid "control" and "variable" groups has me bogged down. (Teacher, Note, March 1992)

> I decided earlier this year that group projects are awkward for me to fairly assess. (Teacher, Personal Journal, March 1992)

The problem is even complicated more by the fact that not all students contribute to the end product equally. How then does the teacher fairly assess each individual's efforts? Her concern and solution are as follows:

> My concern with these two person projects is that sometimes one person does all the work, and the other member receives equal credit . . . I still find grading awkward at times. My solution is to provide both individual and group learning experiences and a variety of assessments. (Teacher, Comment, April 1992)

During an observation (week five of the study), the students asked Collette what other enzymes there were besides the ones being discussed. She quickly answered and

then the entire group researched each she mentioned. Although not actually a problem, since it worked out very well, Collette perceived it in this way:

> I had to do some fast research myself to be certain I was remembering enzymes I had not reviewed for several years! (Researcher, Personal Observation, April 1992)

Utilizing methods of assessment that are broader and are not so narrow in scope tend to make the instructor more anxious, since no one person is capable of having all the answers at their fingertips.

During one particular lesson, Collette instructed her students to research several references and to build identification keys in order to classify new information. The students were requested to work in small groups and share their findings with the other class members.

Collette encountered several problems. First of all, some groups spent considerable time arguing about problems with information classmates recorded on the individual order cards. Not all students were concerned with accuracy and some cards gave partial information.

> The students also had some frustration, some impatience today. This was group work and was not always comfortable for everyone. Students continued to critique each other's work because they now could see the need for specific information. Collette was not sure today's activity went well. (Researcher, Personal Observation, April 1992)

> It was further complicated by the fact that the kids had made their own keys and found their own characteristics. Some were not done as well as others

> and this did handicap the identification process. (Researcher, Personal Observation, April 1992).
>
> Many students were struggling with her specific requests for information and sketches of body parts. She saw frustration and impatience in the students not being able to "lay hands" on one book which would give them all the information. (Researcher, Personal Observation, April 1992)

The problems/barriers perceived by Collette in all cases, to some degree, were valid. The time factor involved in structuring each lesson, designing rubrics, and assigning and assessing projects is tremendous. For an instructor to utilize authentic assessment methods for each lesson would be too labor intensive, and ultimately no one assessment method should be exclusively utilized for every situation.

Not every teacher will be as comfortable as the teacher in this study with relinquishing some control in the classroom situation. The problem of how to fairly judge a student's participation level in a group project or activity is also a legitimate concern that will need to be addressed.

> . . . but my fear is, that at the end of all this, or halfway in the middle, I am going to be like Dr. Wiggins, I am going to still have all these questions. (Teacher, Initial Interview, November 1991)

Positive Reinforcements/Rewards

This item addressed the issue of positive reinforcements/rewards that influenced Collette during the time-line of the study. When asked about some of the highlights associated with teaching (during the initial

reflective interview), Collette responded by stating, "atop of the list is the high school student who comes back and says that you made a difference in his/her life." She also, as part of that same interview, described a preschool workshop experience that she had. The sense of her willingness to continue to explore for better ways of doing things in her classroom is evident in her description as she relates:

> We had a preschool workshop this year . . . explaining rubrics . . . previous to that, I'd never heard of a rubric. My thinking as I looked at rubrics, the ones that she brought, was that they had to be very difficult to write, but it certainly seemed like a more fair way to assess what your students have done. (Teacher, Initial Interview, November 1991)

Perhaps the best reward an educator can receive is feeling as though students have succeeded in learning. Collette, in her personal journal writing, recorded the following examples of how she and her students perceived their learning to be successful:

> But, the quizzes I gave the class yesterday were so much fun to check. It was one of those days when my lesson clicked. (Teacher, Personal Journal, April 1992)

> "How does your digestion project compare in terms of your learning?" The entire class responded without thinking, "we know a lot more. We won't forget tomorrow. I really understand digestion, and I could explain it to anybody." (Teacher, Personal Journal, April, 1992)

> When you do it, you really learn it, they told me. (Teacher, Personal Journal, April 1992)

> This is what a finished rubric/project looks like. There are lots of good ones. This was especially well-organized. (Teacher, Note, May 1992)

Thirty of Collette's students (selected randomly) completed a Student Interview Questionnaire at the conclusion of the study. Two of the questions asked the students to rate on a scale of 1-10 how they felt about science class before the school year and had their feelings about science class changed. The number 1 on the scale was labeled "didn't care for at all," the number 5 signified "no positive or negative feelings," and the number 10 indicated "enjoyed a lot." The average response to the first question was 5.06, slightly over the "no positive or negative feelings." After the implementation of authentic assessment, the students' responses changed to an 8.86 average. This fact, although after the initial implementation of authentic assessment, also acted as a positive reenforcement for the teacher.

Collette witnessed several examples of student success, and this observation reinforced her through the implementation process. When she introduced the Disease Project to her students as a culmination of the Human Body Unit, she asked the students to pick a disease, research it, pretend they were doctors, and share their findings with the class. An added bonus was that Collette suddenly found that her students were obtaining their resources from anywhere

they could in order to know more about the disease researched than anyone else in the class. She described in her journal that:

> Parents are even supplying their students with some wonderful reference/medical books for use with this disease project. (Teacher, Personal Journal, April 1992)

The rewards/reinforcements that seemed to motivate and encourage Collette during the implementation process were both direct (measurable) and indirect (more subjective). Collette definitely was motivated by her desire that her students succeed. The older student who returned to say thank you, or her current students who all do well on a quiz--both situations reinforce this teacher. Although there were problems/barriers associated with implementing a different assessment method into her classroom, there were also some definite positive examples of rewards/ reinforcements during the process.

Intrinsic Motivation

This item addresses the issue of what sort of things or experiences have shaped Collette in the study to drive her to become a better teacher. The initial interview revealed much information concerning this issue to me. Collette related how early on in her education a teacher of hers had been a "big nut on poetry." Collette described how that year she learned more about poetry than she ever thought she

could. When I asked why this was so, she responded that poetry meant a lot to her teacher and that they had been assigned a poetry project.

Another significant turning point in Collette's schooling occurred following her decision to pursue a Master's Degree. She explained the reason why she felt it was time for her to go back to school by explaining:

> I reached a point where I wanted more than it seemed like the repertoire that I had as a teacher. So, at that point, I decided to look into getting my Master's Degree. (Teacher, Initial Interview, November 1991)

Following her Master's Degree, she continued to secure another 15 hours of graduate credit. Much of the course work consisted of topics such as higher-order thinking skills and classroom management. She wanted to know how best to utilize the time that she had with the students in her classroom.

This advanced schooling had a profound impact on Collette and the way in which she viewed her teaching. She explained her feelings by stating:

> I was doing what was in the book and that forced me to actually take a hard look at how I was teaching and what I was teaching and I felt that after I got my feet wet, because my Master's program basically forced me to, I just couldn't imagine teaching the Rote text as I used to do. (Teacher, Initial Interview, November 1991)

Staff development activities provided by the District also played a role in motivating Collette. She and five of her colleagues had the opportunity to attend a thinking/

assessment seminar in Phoenix and visit school districts that were experimenting with different forms of student assessment. Collette was impressed with what she learned and witnessed and shared the following with me:

> These people are so sold on what they are doing (Phoenix) and it is so logical and makes so much sense I have got to make some of those changes in my classroom, and so you start looking very critically at your lessons and what you are doing and how you are doing it, and you start looking very critically and say, what am I doing here, is this the best way to do it? Is this good for kids? Is there a better way? (Teacher, Initial Interview, November 1991)

As Collette slowly implemented more authentic assessment methods into her sixth-grade class, she observed that the students seemed more excited about science and what they were learning. There were several examples from her personal journal where she documented the following observations:

> There were always more volunteers than time available. There was a real variety in approaches to telling the digestive story. (Teacher, Personal Journal, April 1992)

> Last night, 20 students stayed after school and worked in my classroom. A few needed specific help from me, but most just wanted to work and check this idea or that idea with me. (Teacher, Personal Journal, April 1992)

> This assignment turned out to be much better than I expected. My students continue to amaze me. (Teacher, Personal Journal, May 1992)

In reflecting about the people and experiences that acted as motivators for Collette during the implementation process, three major areas emerged:

1. She included a former teacher who had exhibited a love for her subject and assigned a project for all her students to do
2. Her Master's Degree program and graduate hours played a significant part in Collette's search for a better way
3. During the actual study, the numerous examples of the increased excitement and effort by her students in her classroom

> It takes more time--but the learning is internalized and more relevant to the students. Much of this learning they have generated for themselves. My role is to facilitate--to set the stage and step back. They are actually engaged. (Teacher, Personal Journal, May 1992)

Students Level of Responsibility Toward Their Own Learning

This item addresses the issue of Collette's perception of the students' level of responsibility toward their own learning. During the initial reflective interview, I gained some insight into how Collette viewed her role as a teacher in the learning process. She expressed the idea that although she didn't feel that a teacher needed to be an entertainer, she thought that teachers needed to engage children's minds in some way to keep them actively engaged. She continued by explaining that she is thinking in terms of

her students' seeing the world through more adult eyes, of seeing choices available to them, and of having a more global view of the things that they study. She went on to convey that she wished them to be truly critical thinkers, instead of these little people who sit there and when the teacher says do this, they respond by doing just that.

Collette summed up her feelings about this issue by stating that she sees her position as a middle school teacher in the following manner:

> I see our job as middle school teachers as being one where we can increasingly give students greater amount of responsibility for their own learning. (Teacher, Initial Interview, November 1991)

The first unit included in the study consisted of a unit on insects. During an observation period, I observed the following:

Collette began the day's lesson by explaining to the students their task for the day. They were to key eight individual insects using the insects' sketch and description taken from an insect guide. Next, the students found the group cards that corresponded to the characteristics they had identified. They eventually found a match and identified the order of the insect shown. Once this was accomplished, the students were asked to decide what the critical characteristics of each would be. The students

went to work summarizing, comparing, and finally categorizing and classifying each group of insects. They arrived at their own conclusions as to which insect corresponded to which order. The students had spent approximately 10 minutes in grouping (classifying) the 24 sheets according to similarities. Following that activity Collette gave each group two drawings of insects with many characteristics listed. They used their group-made keys to identify the orders. It is evident that the class was beginning to feel like real scientists. They felt the frustration associated with problem solving, something real scientists experience almost daily. During the entire activity the students were doing a good job of critiquing and helping each other compile specific characteristics. As an end of the period review, several "student" teachers explained the characteristics to the rest of the class. It was very evident, while observing this particular lesson, that these students were taking a great deal of responsibility for their own learning. Some student remarks that I documented reinforced that students were learning some interesting things about "their" insects, and wanted to share their findings with the rest of the class. One student exclaimed "the one I'm studying lays 300-1000 eggs at a time!" Another student acknowledged that his insect lives off the excretions of other animals!

Collette's perception of her students' level of responsibility toward their own learning may be described best by the following excerpts from her personal journal. She begins by stating that she "tries to encourage her students to constantly evaluate their own efforts." In the midst of the Digestion Unit, while the students were actively engaged in their projects, Collette documented the following observation:

> Some of these people have done and redone pages time after time. For the most part, they are much fussier about the finished product than I am. They are very critical of their own work--sometimes too much so. (Teacher, Personal Journal, April 1992)

> As I have watched the students assembling their information, I am also reminded that our textbook, again has been relegated to simply a starting point for these sixth graders. They are carrying medical guides, nursing textbooks, biology books, and nearly every book on digestion available in either our own library or the public library. (Teacher, Personal Journal, May 1992)

As the students began to take on more responsibility for their own learning, Collette had some anxious moments as she was afraid that her sixth graders were researching material that was too complex for them. She documented her fears in her journal by stating:

> The students need to simplify their information as they appeared to be heading into complex material. I finally questioned several of them when they were working in my room one morning before school. I shouldn't have worried. (Teacher, Personal Journal, May 1992)

Student comments taken from the post study Student Interview Questionnaire also reinforced the perception that Collette's students were taking a greater responsibility toward their own learning. These comments included:

> All my projects, like I said before, it makes you go out and find additional information. (Student, Post Study Student Interview Questionnaire, June 1992)

> I liked how we used reference books from libraries, instead of our science book because we wanted to learn more complex things. It also helps how my teacher makes a lot of comparisons. (Student, Post Study Student Interview Questionnaire, June 1992)

During the implementation of the authentic assessment methods in her classroom Collette observed that her students were anxious to show her their ideas and their progress. Few of them, however, needed to check with her on each page because of their uncertainty. The students saw themselves as having the competence to complete their projects, making their own decisions, and using their own ideas.

Self-analysis/Self-assessment

This item addresses the issue of how Collette analyzed/assessed herself during the implementation process. An early observation by Collette described to me as part of the initial interview included these thoughts concerning the comparison of paper and pencil tests with authentic assessment methods. Collette wondered aloud:

> Am I testing their knowledge of my subject or am I testing their reading ability, and how much of the time does that reading ability get in the way . . . and so,

> I am beginning to think there may be something else out there that may be at least as valid as the paper and pencil test. (Teacher, Initial Interview, November 1991)

As Collette became more exposed to the theories underpinning authentic assessment, the questioning of her current methods of assessing students also increased. She began to view authentic assessment as "not just the assessment" (isolated) but what comes before the assessment is "at least if not more important than that." She concluded that educators needed to look more into the learners' involvement in the process.

> I think kids are going to learn better. I can't see how that couldn't happen if kids are actively engaged, of course they are learning. (Teacher, Initial Interview, November 1991)

She also surmised that stretching her lessons to challenge her students more should be a priority as she began to implement authentic assessment.

> I think infusing of critical thinking is essential and I think any place it should be done, science is right up there. (Teacher, Initial Interview, November 1991)

After observing a lesson on chemical digestion where Collette assigned her students the task of authoring their own books on the digestive system she stated:

> In previous years, I would not have attempted any assessment this demanding for chemical digestion. There are too many components, it is too complicated. I would not ever have predicted the results--even this year. (Teacher, Personal Journal, April 1992)

Her students could research the digestive system utilizing a number of resources provided by Collette, or any others they could find on their own. Several students interviewed people they knew in the medical field. The assignment had two major objectives: (a) to insure that the primary functions of the digestive system were explained and (b) that the books authored were written and illustrated so that the concept of digestion could easily be explained to third and fourth graders. These students actually became teachers as they shared their finished products. In her personal journal, Collette acknowledged:

> I agree--those of us who teach know all kinds of things because we have had to teach those things to others. That's when real synthesis occurs! (Teacher, Personal Journal, May 1992)

Throughout the implementation of authentic assessment in her classroom, Collette internalized many of the perceived problems and benefits she observed. This self-analysis/assessment encouraged Collette to adjust her lessons to better accommodate her original mission of what authentic assessment might accomplish (the greater involvement of students in the learning process). One of her final reflections documented in her personal journal asked this question.

> It took me 20 years to figure out that I can structure an assignment so that the student cannot simply copy words from an encyclopedia. Why did it take me so long? (Teacher, Personal Journal, May 1992)

Desired Outcomes

This item addresses the issue of how the teacher views the degree her initial goals and objectives were met after implementing the authentic assessment method in her classroom.

Planning is an essential ingredient in the educational process if goals and objectives are to be fully realized. Collette had some initial thoughts on importance of planning and organization and the role they would play for her to attain her objectives.

> Well, I knew it, and I told it to them, but that doesn't mean that they have internalized it, that they have really learned it, and that, to me, is where the time and the structuring of the unit and the writing of the rubric, that's where the time is going to go, because each of these steps is going to have to be really thought through so that the kids arrive at the point you want them to arrive at, where you want them to be. (Teacher, Initial Interview, November 1991)

The designing of the rubrics that would be an essential part of her authentic assessment method needed to be accomplished carefully in order to achieve the desired outcomes. Collette reflected that she needed to design the rubrics in a way that the kids, whether they want to or not, are led through all the steps, and in the end would have successfully built their own classification system for the different classes that exist in the mollusk phylum. She hoped that authentic assessment could provide an opportunity for every student to achieve success in her class, and that

the process would take them from beyond the confines of the textbook. Collette also felt that her present way of assessing students left a lot to be desired.

> I know these kids knew this stuff when we have discussed it, when we have done this, when we have done this activity, when they had to share with other people, they have this knowledge but somehow it doesn't necessarily transfer to that pencil and paper test. (Teacher, Initial Interview, November 1991)

Prior to the actual study, Collette, during the initial interview explained:

> The tests, even though in my tests they are basically true/false, multiple choice, fill in the answer, and I always give an essay question segment to that test, even though we review before the test and even though I give the essay questions ahead of time to help them focus and help them prepare and help them zero in on what really are the critical things in that unit that they should know, I am still losing a lot of those kids. (Teacher, Initial Interview, November 1991)

Her frustration with her earlier evaluation procedures included the fact that a special education student in her class had no way to show he/she had mastered whatever material she has been teaching, primarily because they might not have the reading skills to read the test.

The first major unit taught during the study included lessons on insects. I observed students reviewing previous efforts as they worked to produce an informal listing to identify "family names" of insects. The students expressed examples of their "content thinking" by taking turns restating the characteristics of insects that were shared by all members of the class Insecta. Next Collette instructed

the class to build their own insect keys and attempt some identification. Collette had shared with me that during this lesson it was her intent to stretch the type of thinking that her students would be utilizing. When the students produced the fact that an insect had a nymph stage before becoming an adult, inferences were drawn by several students. The entire lesson took no more than 25 minutes, and Collette had accomplished "forcing" her students to think differently. Students had looked at cause and effect and began to sequence the stages of insects in the proper order.

In her journaling that week Collette acknowledged that her students had achieved the outcomes she had desired. She relayed:

> My expectation was that students would note the errors in number of legs, antennae shape, mouth parts and shapes, and body segments. What I received from student papers were these things and much more! Every student found at least two errors in body structure. Most found five or six errors, and several found as many as ten errors. I never expected anything like ten. I was delighted to learn to be more critical from my students. (Teacher, Personal Journal, March 1992)

Collette's initial thinking about her lessons and the outcomes that she desired became clearer as the study progressed. She designed the objectives for each lesson and then shared with her students. Each assessment instrument/ method was then compared to the teaching outcome desired. Her teaching method changed as she reevaluated exactly what

student outcomes she desired after each lesson. She journaled midway through the study:

> I want them (students) involved in their own and each other's learning. I want to facilitate this lesson rather than deliver it. My students are very capable of accomplishing this without me. (Teacher, Personal Journal, April 1992)

Perception of Students Success/Achievement

This item addresses the issue of how the teacher perceives the level of success/achievement in her students during the implementation of the authentic assessment method. In the initial interview Collette reflected on how she viewed her past student evaluation methods and gave me a glimpse of what she hoped more authentic assessments would yield. She explained:

> I am not providing an opportunity for that low achieving student to, maybe, shine in some area other than that worksheet or that written assignment or that paper-pencil test, and the high achieving student, thinking of what they could do if I would just get out of the way, and let them go with my material a little bit and if I could loosen up on this assessment just a bit. (Teacher, Initial Interview, November 1991)

Examples of students' finding success were prevalent throughout the implementation process. The following excerpts from Collette's personal journal writing, notes, and periodic interviews included the following observations:

> I am seeing an amazing variety of ideas. As I've noted with other projects, the students are researching and adding information far beyond my expectations for them. (Teacher, Personal Journal, April 1992)

> Nearly every student listed the main nutrients found in their particular food and then proceeded to list, in sequence, each mechanical and chemical step in the digestive process, right through the final step of water absorption in the large intestine. (Teacher, Personal Journal, April 1992)

> I am amazed and very pleased with the quality I'm seeing from these sixth graders. There is much evidence of higher level thinking, as well as good production skits. (Researcher/Teacher Conversation, April 1992)

> Students who have a strong beginning and feel good about their ideas are much more motivated, not only to finish the project, but to go the mile to produce a really quality product. (Teacher, Personal Journal, April 1992)

> Next I asked . . . which of the six nutrients was best shown in that particular food picture . . . everyone could find success in this activity. (Researcher, Personal Observation, April 1992)

One of the more important revelations by Collette during the study occurred after she had designed and assigned her Digestion Project rubric; she observed even her lower functioning students aimed for the "A" column and its requirements. Moreover, her students worked at times cooperatively, and Collette further observed that her students were glad to help each other with materials, resources, and ideas. Yet each individual was extremely proud of his/her own unique approach to the authoring of the children's book.

She required that each student give an oral summary at the conclusion of the Digestion Project to the entire class. Collette documented in her personal journal after the day's

activities that "nearly half of her students gave their entire digestion summary without a note card! They really knew the process!"

Several students commented on this particular unit as they completed their post study Student Interview Questionnaire. Two of the comments that more clearly describe the students' reactions to the Digestive Unit Project include:

> I didn't know a lot about it at first, but after I was done, I had found out a lot while writing the book for the third and fourth grade kids. (Student, Post Study Student Interview Questionnaire, June 1992)

> We were asked to write the books and also had to explain it. (Student, Post Study Student Interview Questionnaire, June 1992)

One student commented, when asked how he had enjoyed the assignment, answered "it was kind of fun. It was still a lot of work, but I liked doing it." At the end of this particular project Collette related:

> There are no surprises in this evaluation process. The students can assess their own progress as the work--and before I evaluate at the end of the project. (Teacher, Personal Journal, April 1992)

Periodically, as the study progressed and the teacher became more confident in the implementation process, she noted several examples of what she perceived to be successes for her students along the way. The following excerpts are some examples:

> Every student did well on this quiz. Most wrote extra functions (more than the two I asked for). Even the special needs students were successful. The lowest grade I gave was a C! (Teacher, Personal Journal, May 1992)

> They constantly tell me it doesn't tell them enough and that they have found better things, usually this is true. (Teacher, Personal Journal, May 1992)

> The students like the link we have used. We have practiced linking new information to old in previous lessons but this lesson is perfect. The students have found success quickly and they feel proud of themselves for thinking of a method they can use to remember this information. (Teacher, Personal Journal, May 1992)

> Many of them are anxious to show me their progress. And, it's fun to see the diversity of ideas--and their creativity. (Teacher, Personal Journal, May 1992)

Collette and I observed and noted numerous examples of student success during the implementation of authentic assessment methods. At times the students seemed to work together in small groups without as much trouble as they had in the past. Individuals within the groups were open to sharing information and groups enthusiastically shared their research with other groups. All students knew before each assignment exactly how they were to be assessed, and it was evident that students wanted to achieve the highest level of competence. Students seemed to enjoy some of the newer methods of assessment. Collette, while conducting an end of the period review, observed:

> The questions were repeated and liberal clues given was allowed. Points were doubled for the last 15 minutes of class. The kids were learning in spite of

> themselves. Everyone had a good time. The day was a success. (Researcher, Personal Observation, May 1992)

Perception of Change in Climate/Culture

This item addresses the issue of how differently the teacher perceives the climate/culture of her classroom after the implementation of the authentic assessment method. During the initial interview, Collette shared her feelings of how the environment of the school district in which she worked could be described:

> I have also had the advantage of working in a school system where I think we have extremely progressive and very encouraging administrators. Denison is on the cutting edge of anything educationally that is going on in the state...and that is a neat environment for a teacher to work in. (Teacher, Initial Interview, November 1991)

The perceived changes in the teacher's climate/culture of her own classroom were documented by a combination of researcher observations as well as daily personal journaling by the teacher. During one observation period Collette experimented with having the students pretend they were actual scientists. She remarked that she felt that sixth graders are still open to pretending and she used it to get them to think about something in another way.

> Children worked as entomologists constructing insect keys and using those keys to identify a set of insects provided by the teacher. This was an authentic process. (Researcher, Personal Observation, March 1992)

She led her class in the examination of the five main classes of arthropods. Her students zeroed in immediately

on the differences among the classes. She observed that her students had been able to identify (prioritize) characteristics as being basic and structured or being "nice to know but not basic." Their attitudes toward science and particularly research was beginning to change:

> Their attitude about research is generally very good also. They don't see this as extra work. They see it as being real scientists, researchers. (Teacher, Personal Journal, March 1992)

In her daily journaling, Collette noted these observations:

> The kids in each class generated their own list of seven or eight reasons for the success of insects with little teaching prompting. Our text has a list of only five which the students examined after making their own list and perceived as being a pretty "weak" set of reasons. (Teacher, Personal Journal, March 1992)

> There are very few questions relating to the rubric today, and students seem to have a clear direction to their work. (Teacher, Personal Journal, April 1992)

> Kids pointed out that they seldom use textbooks for much besides pictures any more. They concluded after examination of two book pages that "we know lots more than what's in the book." They gave lots of examples of things learned beyond the text. (Researcher, Personal Observation, April 1992)

The perceived changes in the climate/culture of the class during the implementation of authentic assessment was perhaps the most difficult to quantify. Collette views her school district as one that fosters experimentation and supports teachers in new endeavors. In her classroom she sensed positive attitudes in her students during some of the real-life activities (entomologists). Her students at times

generated new lists and ideas on their own and seemed to enjoy sharing their findings with their classmates. Collette also observed an increased confidence level in her students as they began to individually research beyond the textbook.

> I encourage them to look critically at the information in our text based on their own research findings. Our text has been criticized all year by sixth graders. It's not a bad book, but doesn't have "meat" the kids want in topics we study. (Teacher, Personal Journal, April 1992)

Teacher Perception of Student Performance

This item addresses the issue of how the teacher views her students' performances during the implementation of authentic assessment strategies. During a post-study interview Collette explained that it seemed her students knew more in terms of depth of learning during the authentic assessment experience. She also observed that for the first time in her teaching career that she did not have any student who was not working at all. Many of her students were achieving to a higher degree than in the past. Collette summarized her feeling concerning this issue by saying:

> The students are now seeing the big picture--the concepts are there--coming from the kids--not just word association anymore. (Teacher, Post-study Interview)

The teacher's perception of her students' performance after the implementation of authentic assessment was

positive. Collette views her students as achieving more; widening the breadth of their learning, and learning to a greater depth. As Collette structured her rubrics, she observed that her students began to expect more of themselves, and strived to accomplish the higher standards outlined in the rubrics.

Chapter 5

SUMMARY, CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

The purpose of this study was to document the effects upon the teacher as she implemented the process of authentic assessment in her sixth-grade science class.

The two basic research questions I addressed in this study were:

1. What were the experiences and perceptions of the teacher as she implemented Authentic Assessment in sixth grade science?
2. What student changes were observed during the treatment time period in which the Authentic Assessment process was implemented?

Summary

Wiggins' (1990) Authentic Assessment Model has been offered as an alternate assessment program in student assessment. Designed to be used in classrooms at all grade levels, it uses a combination of tasks which are valued, to challenge students in real life problem solving situations. It focuses on the student's ability to produce a quality product and/or performance, that requires students to effectively use prior knowledge, and good judgment in solving problems. Authentic assessment is one assessment

alternative among many that stresses the processes as well as the products of learning. These assessments encourage educators to move beyond the conventional "one answer to a problem" mentality to challenge students to explore possibilities inherent in complex problems, and to draw their own inferences (Wiggins, 1990).

Educators have long reflected on their classroom assessment practices to evaluate both the soundness of those practices and the impact of assessment on the students in their classrooms. This study has attempted to document the reflections/perceptions of a teacher as she implements authentic assessment in her classroom, using a qualitative approach by descriptively analyzing the effects of the implementation process on the teacher. It has offered the opportunity to gain insight, discovery, and interpretation into the perceptions of the teacher implementing authentic assessment.

I reviewed, analyzed, and compared the data gathered to provide an in-depth description of the teacher's background, classroom, teaching methods, and attempts at utilizing authentic assessment. I categorized the analysis of the data collected into 10 Assessment Criteria Benchmarks. I based 9 of these benchmarks on teacher perception and 1 on student performance. The descriptions of the data based on these 10 categories yielded the conclusions of this study.

Conclusions

1. The degree of risk taking by the teacher

The teacher's degree of risk taking increased as the project progressed. During the initial reflective interview, the teacher stressed the importance her Master's Degree program had played in encouraging her to think differently and become more open minded to experimenting in her classroom. This seems to reenforce how important it is for educators to continually strive to stay current and return periodically to the classroom themselves. As the study progressed, the teacher became less anxious before implementing new techniques. As she experienced success after implementation of a new strategy/technique, she became more confident to continue and experiment even further.

2. Teacher perceived barriers/problems

The teacher perceived time, issues of fairness, and designing appropriate assessments as primary barriers or problems. The amount of time involved in structuring each lesson, designing rubrics, and assigning and assessing projects is considerable. The teacher learned that to utilize authentic assessment methods for each lesson would be too labor intensive and ultimately no one assessment method should be exclusively utilized for every situation.

3. Teacher positive reinforcements/rewards

Positive rewards/reinforcements during the study included the teachers perception that her students seemed to enjoy their learning more and scored higher on periodic traditional quizzes that were administered as a check throughout the study. Students also expended the parameters of the lessons on their own and shared their new found discoveries with their classmates willingly.

4. Teacher intrinsic motivation

Three major areas of intrinsic motivators emerged during the study.

a. The teacher's prior personal experience with a former teacher who had exhibited a love for her subject and assigned a project for all her students to do

b. The teacher's Master's Degree program and subsequent graduate hours played a significant part in the teacher's intrinsic motivation

c. Many examples of seeing her students succeed throughout the study also acted as continuous motivation for the teacher

5. Teacher's perception of student level of responsibility toward their own learning

Students were perceived by the teacher as anxious to share their ideas and progress with the teacher as well as their classmates. Students exhibited competence to complete

projects while making their own decisions and using their own ideas.

6. Teacher's self-analysis/self-assessment

Continually throughout the study, the teacher reflected on the outcomes she wanted her students to ultimately exhibit. She adjusted her lessons to better accommodate her students and to ensure that they use their knowledge effectively and creatively. The teacher reflected upon the daily interactions between herself (the assessor) and her students, continuously striving to improve the process and ultimately to improve student performance/mastery.

7. Teacher's desired outcomes

The desired outcomes (objectives) of each lesson were then shared with her students. She ultimately wanted her students to be involved in their own and each other's learning. The teacher wanted to become more of a facilitator of knowledge rather than merely a deliverer of it.

8. Teacher's perception of student success/achievement

Numerous examples of student success were observed and documented throughout the study by the teacher and the researcher. Examples include:

a. Students working together in small groups without as much trouble as they had in the past

b. Individual students were more open to sharing information with others

c. Students knew before each assignment exactly how they were to be assessed and it was evident that students tended to look at achieving the highest level of competence

9. Teacher's perception of change in climate/culture

In her classroom, the teacher sensed positive attitudes in her students during some of the real life activities. She also observed an increased confidence level in her students as they began to individually research beyond the textbook.

10. Teacher's subjective assessment of student performance

The teacher believed that generally the level of student effort and overall performance was greater while implementing authentic assessment methods.

Recommendations

1. Administrators who are contemplating their faculty members implementing alternate assessment techniques into their classrooms, must be aware of several important aspects of the implementation process. Implementation of new techniques/methods of instruction in classrooms necessitates changing one's traditional ways of doing things. Administrators who are aware of the change research will

have a better idea of the possible pitfalls that may emerge during the implementation process, and be more able to supply the needed support to their teachers. Close communication between the administrator and the teacher(s) implementing the new method is integral. At times the administrator takes on the role of a cheerleader, resource person, problem solver, and friend as the teacher copes with the ups and downs and ambiguity of change.

2. Although authentic assessment may have merit as an alternate assessment method, it should not be used in all situations since the amount of time necessary to implement authentic assessment is great. Depending on what a teacher wants to evaluate, time available, and teacher knowledge and skill, other assessment methods may prove to be quicker and more valuable.

3. Continuation of this research in the following manner will allow further study of the merits of authentic assessment in the classroom. New studies of the authentic assessment method should include:

a. An increase in the number of teachers within the study

b. An expansion of the disciplines involved in the study

c. An extension of the grade levels studied beyond sixth grade

4. Authentic assessment may be applicable as an alternative to students with various learning styles, as well as possibly working with lower functioning students. The teacher observed several times during the study, that the authentic assessment approach seemed to excite some of her lower functioning students and, in fact, they performed at a higher level during the authentic assessment activity. More research should be conducted to examine the relationship between authentic assessment strategies and the educational outcomes for students of varying abilities and learning styles.

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Appendix A

AUTHENTIC ASSESSMENT COMMUNICATIONS

MEMO

November 21, 1991

TO: Collette Huntley

FROM: Bill Wright

RE: Initial Interview

Collette, before actually beginning the implementation of the authentic assessment process in your classes, I would like to schedule an initial interview with you.

During the interview I would like to explore some of these general areas:

1. General background, family, education and teaching experience.
2. Changes you have observed in teaching, and challenges you see in educating middle school youngsters.
3. Strengths and weaknesses of our current science curriculum.
4. Highlights/frustrations in your teaching.
5. Professional development--leading to authentic assessment.
6. Why the need to explore alternate assessment techniques?
7. What do you hope to see in your classes utilizing authentic assessment?

Although the interview will be somewhat structured, there should be plenty of room for spontaneity. If you don't mind, I will be video taping the interview so it will be easier for me to analyze later on. Please call my office, 263-2176, and let me know which days will work for you. I am anticipating it will take approximately one hour. I will work my schedule around yours.

Collette, thanks again for agreeing to be part of this project. Hopefully it will be fun as well as educational and informative for all concerned.

INITIAL REFLECTIVE INTERVIEW QUESTIONS

I. Background of Teacher

A. Family
B. Education/Teaching experience
C Why did you choose science education?
D. What can you tell me about middle school students.

II. Teaching

A. Are there differences in middle school students in your classes today as compared to years ago?
B. What have these changes meant to you as a teacher?
C What are some of the joys/highlights that are associated with your teaching?
D. What are some frustrations that you feel?

III. Professional Development/Authentic Assessment

A. What have you done over the last few years to improve yourself as a teacher?
B. How did you get interested in authentic assessment?
C Personal background of authentic assessment.
D. Why do you feel you want to try this process with your students?
E. Have you tested the waters with authentic assessment in your classes to date?
F. What do you hope to find through this process?
G. What changes do you forsee that will need to be made for you as a teacher?

IV. Anything Else.

Appendix B

REFLECTIVE INTERVIEW QUESTIONS

STUDENT INTERVIEW QUESTIONNAIRE

1. **Describe the ways you think that Mrs. Huntley has evaluated you this past year.**

* Projects xxxxxxxxxxxxxxxxxxxxxxxxxx
* Talking/Giving Lectures x
* Assignments xxxx
* Grading xx
* By showing us how to test our blood x
* Acting out systems of the body x
* Tests (Written and Oral) xxxxxxxxxxxx
* Worksheets xxxxxxxx
* Dissections xxxx
* By the number of points that we received on our papers x
* Whether we learn a lot on what we're doing x
* Rubrics xxxxxxxx
* Points xxxxx
* How hard we work x
* Average of grades x
* Quizzes xx
* Making it fun while we learn x
* Class plays x
* How well you pay attention in class x
* How well you do your assignment and have them in on time x
* Classroom participation x
* Reports x
* Papers x
* She has been very fun to listen to and she makes you work easier x

* (x = number of responses)

2. **Which of the methods of evaluation listed above do you think was best. Explain**

* Assigning projects because it taught me better
* Talking or giving lectures
* I think acting out the system and what the systems do for the body was the best. This is because she gave us a chance to learn new things.
* Projects because we get to do what we want to do (like she says we have to do something on the brain and you can do what you want on the brain).
* I think it was all of her projects because she has taught us how to think like scientists so we have done some really good projects.

5. **Of the many things you learned in science class this year, what do you remember most? Why?**

* Testing blood and doing different projects. Because I enjoyed it and it taught me a lot about science and its importance.
* About the systems of the body because we studied them and we spent about half a year on all the systems.
* I remember learning about frogs, fish and earthworms Because we did dissection.
* How to do projects because we did quite a few.
* The thing I remember the most was the studies we did on Charles Darwin because we had to put a lot of time and effort to make a magazine on Charles Darwin and the Gallopose islands.
* The digestion book. I didn't know a lot about it at first, but after I was done I had found out a lot while writing the book for the 3rd and 4th grade kids.
* Things mostly about the human body. Example: The digestive system in the human brain. We did enjoyable projects on these and spent a lot of time on them.
* The frog dissecting because it was a lot like our human body and it was a very fun experience.
* The bones because I've always enjoyed bones but she gave us a fun way to learn.
* All my projects like I said before it makes you go out and find additional information.
* The brain because everything we did had something to do with the brain.
* The reproductive and digestive systems and the brain because we did projects on them.
* The skeletal system because I can still remember all the bones' names.
* Dissecting the frog because it was the most interesting.
* The reproductive system because we just studied it.
* I remember the most is dissecting the frog, fish, and worm because I have never dissected anything at all in school.
* The brain because we studied it a lot (at least I did).
* I remember the frogs, fish and earthworm dissection because they were things that we enjoyed and will probably never do again.
* The classes of animals because it was neat and interesting and I like animals a lot.
* I remember the things about the systems best because of the projects we did on that subject.
* Darwin Magazines because it's something I'm interested in and I thought it was challenging.
* Digestive system because we talked about it a lot and we had to make a book about the digestive system and we had to explain it.
* The frog because we saw the parts of the frogs. We memorized almost all of them and we took a 50% test over it.
* The human body because it was neat and I learned it last year and I knew some and it is neat to know the bones in the body.
* Darwin because we spent the most time on it.
* That I'll never forget anything my brain just won't let it out and I was amazed.
* What the reproductive system does because I think it is very interesting.

* Dissections - I didn't know very many things about worms, fish, and frogs before I did the dissection. Now I would say I know quit a bit about these animals.
* Rubrics/projects - you have a choice of what you want your grade to be. In projects you can use your own creativity, like how you want to show something.
* The projects because they're easy for her to grade (kind of) and they're fun for us so we do as best as we can.
* Tests because it gives us a better chance to prove ourselves.
* Projects - it makes you remember more. You had to go out and find more information beyond a text book and encyclopedia.
* Projects because you didn't have to do worksheets. The projects counted for a lot.
* Rubrics - you can help by telling your opinion of what grade you should get.
* Projects
* Points from worksheets and tests.
* Points because you know what your real grade is by looking at all your papers.
* Projects because people really got into their work and Mrs. Huntley picks fun projects.
* Points
* I think the projects were the best because they were something that we enjoyed.
* Making fun while we learn because its easier to learn.
* Projects because once you have studied your project subject you know a lot about it.
* Projects because it wasn't intense, like taking a test and her projects were fun.
* How well you do your assignments and if they are in on time is the best because a teacher really can't just grade you on how you act.
* Projects because they really show how you do your work the most.
* Projects because she can see what we learned and how much time we spent on it and how we studied to make the project.
* Projects because it was the most understandable and it was fun.
* Grades because you can't have assignments without grades.
* Projects because you have to look up information and also because it is fun to do projects for science now.
* Projects - I learned by looking for myself and learned the most.
* Projects - they are long and she expects a lot out of us to do this.
* Dissections because you get to act out things.

3. **On the scale of 1-10 rate how you felt about science class <u>before this school year.</u> (Please circle the appropriate number.)**

* Rated 5.06 (30 questionnaires)

4. **Have your feelings about science class changed? Evaluate once again on a scale of 1-10. (Please circle the appropriate number.)**

* Rated 8.86 (30 questionnaires)

* Project on the brain because I looked up and read three articles and spent lots of time (10-15 hours) on this project.
* Charles Darwin because we spent a lot of time on it like the project on a magazine research.
* Dissections because I guess it was neat to see it in real life instead of in pictures.

6. Any additional comments?

* Mrs. Huntley was an excellent science teacher.
* Actually, no, but I did enjoy having her teach us. She was a great teacher!
* It helps you learn if you have a nice teacher.
* I'd say that this was the best year that I ever had in science. Even playing bingo made learning fun and really easy.
* I liked how we used reference books from libraries, instead of our science book because we wanted to learn more complex things. It also helps how Mrs. Huntley makes a lot of comparisons.
* I think Mrs. Huntley is a good teacher because she doesn't give us that many tests, but we still learn a lot.
* Mrs. Huntley is a great teacher to learn science with.
* I learned more this year than any other.
* I like how she hit everybody's learning style in every chapter.
* I enjoyed social studies better than science.
* The way Mrs. Huntley made science fun was what made me want to learn.
* Mrs. Huntley made science fun, before I thought it was okay but now I love it!
* Science is more fun this year than it was last year.